

DIGITAL VIDEO CAMCORDER CAPABLE OF RECORDING AND PLAYING GOLFING ACTIONS

Field of the invention

The present invention relates to a digital video camcorder and, more
5 particularly, to a digital video camcorder capable of comparing different
golfing actions.

Background of the invention

People usually playing golf, regardless of beginners or professionals, care
about their golfing actions most. Whether the golfing action is correct not only
10 relates to whether one can acquire a good achievement, but also is a key to
scale new heights in the golfing technique. There are many people that play
golf often. However, little can find someone to correct one's own golfing action.
Therefore, various electronic auxiliary products have been developed. For
instance, PGC600R offered by the Caddy Shak Company makes use of a
15 built-in digital video camcorder to record one's golfing actions and analysis
software to analyze and compare the golfing actions. However, this product is
expensive and bulky, and has complicated functions. It is generally used in a
fixed place and exclusively used by professional coaches for teaching analysis.
A common golf fan can't afford this product. Existential commercial digital still
20 cameras and digital video camcorders can't provide functions of split-frame
comparison, full slow-motion play and image input because they are not
designed exclusively for golf.

Accordingly, how to make a low-cost digital video camcorder capable of
correcting golfing actions for common golf fans is a problem to be urgently
25 solved in the industry.

Summary and objects of the present invention

The primary object of the present invention is to provide a low-cost digital video camcorder capable of recording and playing golfing actions to play golfing actions of more than one golfer in a slow-motion, freeze-frame or 5 split-frame way. A user can thus check his golfing actions anytime. Moreover, a bulky and too expensive golfing analysis equipment in the prior art can be saved.

Another object of the present invention is to provide an image input module for inputting golfing action images of another golfer into the digital video 10 camcorder.

Another object of the present invention is to provide a digital video camcorder having the split-frame function so that golfing actions of two golfers can be displayed on the same frame.

To achieve the above objects, the present invention provides a digital video 15 camcorder capable of recording and playing golfing actions, which comprises a lens set, an optical sensor, an image processing module, an image input module, an image display module, a mode select module, a microprocessor, a memory unit and a display unit. After a function of the mode select module is selected, a first image sensed by the optical sensor via the lens set and processed by the 20 image processing module or a second image inputted by the image input module can be recorded into the memory unit. The microprocessor and the image display module can simultaneously play two images already stored in the memory unit and display them on the display unit in a slow-motion, freeze-frame or split-frame way. A touch pen can then be used to directly draw 25 illustration lines on the display unit.

The various objects and advantages of the present invention will be more readily understood from the following detailed description when read in conjunction with the appended drawings, in which:

Brief description of drawing:

- 5 Fig. 1 is a perspective view of the present invention;
- Fig. 2 is a circuit block diagram of the present invention; and
- Fig. 3 is a disposition diagram of the present invention and peripherals.

Detailed description of preferred embodiment

As shown in Fig. 1, a digital video camcorder 1 capable of recording and playing golfing actions has a touch liquid crystal display panel 11, a remote controller 12, an I/O terminal 13, a mode select button 14 and an external memory card 15. The touch liquid crystal display panel is used to display golfing images, a mode select menu, and lines directly drawn by a touch pen 11'. The remote controller 12 is used to remotely activate the shooting function of the digital video camcorder 1. Signals of the remote controller 12 can be transmitted with infrared. A remote control receiver 121 is also provided to receive signals of the remote controller 12. The I/O terminal 13 is used to connect with peripherals. A video output terminal 131 of the I/O terminal 13 is used to output video to a television. The output format is NTSC or PAL. A video input terminal 132 of the I/O terminal 13 is used to input video to the digital video camcorder 1. A universal serial bus (USB) 133 of the I/O terminal 13 is a communication interface between the digital video camcorder 1 and a computer. The mode select button 14 can be used to select the image-playing way including slow-motion play, freeze-frame play, split-frame play and so on.

25 The external memory card 15 is inserted into a memory card slot (not shown)

in the digital video camcorder 1, and is made of flash memory for storing the shot image.

Please refer to Figs. 2 and 3 at the same time. When the digital video camcorder 1 is used for common shooting function, light 17 from the golfing action of a golfer is focused by a lens set 2 and then impinges onto an optical sensor 21. The optical sensor 21 can be a charge-coupled device (CCD) or a complementary metal oxide semiconductor (CMOS). Analog image signals of the optical sensor 21 are converted into digital signals by a analog-to-digital conversion unit 22. After selected by a signal source select unit 41 in an image processing module 4 and processed by a digital signal processing unit 42, the digital image signals are temporarily stored into a dynamic random access memory (DRAM) 431 or a static random access memory (SRAM) in a memory unit 43. The digital image signals are then stored into the external memory 15.

When a user wants to record an externally inputted video, he first inputs golfing images of another golfer via the video input terminal 132. The golfing images are converted by an analog-to-digital conversion unit 71 and a decoding unit 72 of an image input module 7 into digital image signals. After selected by the signal source select unit 41 and processed by the digital signal processing unit 42, the digital image signals can be temporarily stored into the DRAM 431 or the SRAM 432 in the memory unit 43. The digital image signals are then stored into the external memory 15.

When the user wants to display frames from the digital image signals, he first uses the mode select button 14 to select one of a normal speed play mode 51, a slow motion play mode 52, and a freeze-frame play mode 53 of the mode select module 5. The golfing digital images stored in the memory unit 43 will

be first placed in a first display buffer 811 of an image display module 8, stored into the display unit memory 83 through the image combination unit 82, and then outputted to a display. The display can be the liquid crystal display panel 11 of the digital video camcorder 1, a television 19 connected with the video 5 output terminal 131, or a computer 18 connected with the USB 133.

When the user wants to simultaneously play two different images in a split-frame way, he first uses the mode select button 14 to select a split-frame play mode 54 of the mode select module 5, and then selects two images in the memory unit 43 to be played. The two images are stored into the first display 10 buffer 811 and a second display buffer 812 of the image display module 8, respectively, stored into the display unit memory 83 through the image combination unit 82, and then outputted to the display in the split-frame way.

To sum up, the digital video camcorder of the present invention is only used to record and play golfing actions, hence saving an expensive golfing analysis 15 equipment and complex analysis software required in the prior art. If it is necessary to further analyze the golfing actions, the images can be downloaded to a computer for analysis. Moreover, the digital video camcorder of the present invention has a small size so that a golfer can take it for recording his golfing actions anywhere.

20 Although the present invention has been described with reference to the preferred embodiments thereof, it will be understood that the invention is not limited to the details thereof. Various substitutions and modifications have been suggested in the foregoing description, and other will occur to those of ordinary skill in the art. Therefore, all such substitutions and modifications are intended 25 to be embraced within the scope of the invention as defined in the appended